

Academic Year: (2023 / 2024)

Review date: 05-01-2024

Department assigned to the subject: Electrical Engineering Department

Coordinating teacher: LASO LLORENTE, ANTONIO

Type: Compulsory ECTS Credits : 6.0

Year : 3 Semester : 2

REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)

Electrical Power Engineering Fundamentals
 Transient in Power Systems Fundamentals
 Transformers and Magnetic Circuits
 Transmission Lines and Switchgear

SKILLS AND LEARNING OUTCOMES

CB1. Students have demonstrated possession and understanding of knowledge in an area of study that builds on the foundation of general secondary education, and is usually at a level that, while relying on advanced textbooks, also includes some aspects that involve knowledge from the cutting edge of their field of study.

CB2. Students are able to apply their knowledge to their work or vocation in a professional manner and possess the competences usually demonstrated through the development and defence of arguments and problem solving within their field of study.

COCIN1. Ability to draft, sign and develop projects in the area of industrial engineering for construction, renovation, repair, preservation, demolition, manufacture, installation, assembly or operation of: structures, mechanical equipment, energy installations, electrical and electronic installations, industrial plants and installations and automation and manufacturing processes.

COCIN4. Ability to resolve problems with initiative, decision-making, creativity, and critical reasoning skills and to communicate and transmit knowledge, skills and abilities in the Industrial Engineering field.

COCIN5. Knowledge to perform measurements, calculations, assessments, appraisals, surveys, studies, reports, work plans and other similar jobs.

COCIN6. Ability to deal with mandatory specifications, regulations and norms.

COCIN11. Knowledge, understanding, and capacity to apply the necessary regulations while pursuing the profession of Technical Industrial Engineer.

CEP1. Capacity to design a system, component or process in the area of electrical engineering in compliance with required specifications.

CEP2. Knowledge and ability to apply computational and experimental tools for analysis and quantification of electrical engineering problems.

CEP3. Ability to design and carry out experiments to analyze and interpret data obtained.

ECRT3. Capacity for calculation and design of low and medium voltage electrical installations.

ECRT4. Capacity for calculation and design of high voltage electrical installations.

By the end of this content area, students will be able to have:

RA1.3. Coherent knowledge of the branch of electrical engineering including some at the forefront of their branch in electric power facilities.

RA2.1. The ability to apply their knowledge and understanding to identify, formulate and solve problems of electric power facilities using established methods.

RA2.2. The ability to apply their knowledge and understanding to analyse engineering products, processes and methods.

RA3.1. The ability to apply their knowledge and understanding to develop and realise designs to meet defined and specified requirements.

RA3.2. An understanding of design methodologies, and an ability to use them.

RA4.1. The ability to conduct searches of literature, and to use data bases and other sources of information.

RA4.2. The ability to design and conduct appropriate experiments, interpret the data and draw conclusions.

RA5.1. The ability to select and use appropriate equipment, tools and methods in electric power facilities.

RA5.3. An understanding of applicable techniques and methods in electric power facilities, and of their

limitations.

RA5.4. An awareness of the non-technical implications of engineering practice.

RA6.3. Demonstrate awareness of the health, safety and legal issues and responsibilities of engineering practice, the impact of engineering solutions in a societal and environmental context, and commit to professional ethics, responsibilities and norms of engineering practice.

OBJECTIVES

This subject enables the student to acquire the following competences and skills.

- Designing a L.V. installations and select its components properly.
- Anlizing electromagnetic transients in electrical systems.
- Knowing the origin of the main overvoltages in an electrical system (clasifierd according their duration) and how to protect equipment against those overvoltages.
- Selecting properly the switchgear of a médium and high voltaje facility.
- Acquiring skills on the use of simulation softwares for electrical systems.
- Acquirin the knowledge to analyze the steady state and the transient state of an electrical facility.

DESCRIPTION OF CONTENTS: PROGRAMME

L.V. Installations. Conductor selection. Fuse selection. Breaker selection.

H.V. and M.V. Installations. Circuit breaker selection. Current and Voltage Transformers. Overvoltages (temporary, switching transientes, lighthning overvoltages). Surge arresters.

LEARNING ACTIVITIES AND METHODOLOGY

Two sessions of teaching classes, one of them of theory and the other of problems.

3 practical sessions about designing electrical facilities.

ASSESSMENT SYSTEM

Theory exams

Problem exams

Laboratory sessions.

% end-of-term-examination: 60

% of continuous assessment (assigments, laboratory, practicals...): 40

BASIC BIBLIOGRAPHY

- A.R. Hileman Insulation Coordination for Power Systems, CRC Taylor and Francis, 1999
- Jose Garcia Trasancos Instalaciones Electricas en Media y Baja Tension , Paraninfo , 2016